

PAST TRANSGRESSIVE AND REGRESSIVE LACUSTRINE DEPOSITION ON THE RIO DESAGUADERO PLAIN, BOLIVIA

J. Platt Bradbury 28511 Golden Gate Canyon Rd., Golden, Colorado 80403

Elevated lake shore terraces and deposits of lacustrine tufa mark the margins of the fluvial / lacustrine plain of the Rio Desaguadero and testify to the presence of extensive past lakes in this mega-basin, now occupied by the Uyuni and Coipasa salars and the shallow, saline Lago Poopo. Eight 50-m cores raised along a 200-km transect following the Rio Desaguadero north of Lago Poopo track the past interplay of lacustrine and fluvial environments as these large lakes presumably expanded and contracted across the Desaguadero plain.

The cores date back to about 60 ka. Diatom analyses of lacustrine and wetland sediments document the paleolimnological character of aquatic environments that could represent the stratigraphic equivalents of the high-stand terraces and deposits. Diatoms from the deposits define four distinctive environments:

1. Shallow, fresh, wetland habitats in which epiphytic and benthic freshwater diatoms predominate (*Epithemia adnata*, *Cocconeis placentula*, *Synedra ulna*, and *Fragilaria* species). Analogous habitats have water typically <1 g/L tds, depths usually <1 m, and abundant emergent and submergent aquatic vegetation. Terrestrial diatoms (*Hantzschia amphioxys*, *Navicula mutica*, *Pinnularia borealis*) from meadow and moist soil habitats surrounding the wetlands often form an important component of these assemblages. A more saline variant of this assemblage contains *Navicula peregrina*, *Gyrosigma spenceri*, several *Nitzschia* species, and *Diploneis simthii* among the other diatoms more tolerant of saline water.
2. Shallow, comparatively saline, wetland, marsh, or littoral habitats in which epiphytic and benthic saline diatoms predominate (*Synedra fasciculata*, *Achnanthes brevipes*, *Mastogloia atacamae*, *Rhopalodia wetzeli*, *Surirella sella*). According to analogs in the region, salinities of this assemblage may reach 35 g/L. These benthic species also live in shallow water within the photic zone, at depths generally less than 5 m.
3. Fresh, open-water / planktic habitats characterized by *Cyclotella andina*, and *C. Stelligera*.
4. Saline, open-water / planktic habitats with *Cyclotella* sp. cf. *C. caspia* and *C. meneghiniana*. Because both fresh and saline planktic diatoms (groups 3 and 4) are suspended in the photic zone by turbulence, they can (but do not necessarily) characterize deep water environments.

Preliminary and ongoing diatom evaluation indicates that shallow, fresh, moderately saline, and saline environments dominate the lacustrine intervals encountered in the four southernmost cores of the transect. Diatoms representative of extensive, open-water (deep?) and persistent lacustrine conditions are rare or absent throughout the records. However, large abundances of shallow-water, saline diatoms with small percentages of saline planktic species may represent the littoral facies of large lake systems to the south. If so, stratigraphic candidates exist for the late and pre glacial (12-16 ka and ~45 ka) Tauca and Minchin lake phases, but deep lake conditions appear to have been absent or only short-lived according to these stratigraphic records.